



Annual Report on Public Safety Wireless Voice and Data Communications in the Commonwealth of Kentucky

Submitted by Commissioner Mark Rutledge
Commonwealth Office of Technology
Finance and Administration Cabinet
September 15, 2006



A Report to the Interim Joint Committee on Seniors, Veterans, Military Affairs, and Public Protection and the Interim Joint Committee on State Government on progress and activity by agencies of the Commonwealth to comply with standards to achieve public safety communications interoperability.



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Executive Summary

As required by KRS 11.5163, this report serves to update the committee members on the progress and accomplishments of the Kentucky Wireless Interoperability Executive Committee (KWIEC) since the last reporting cycle in furthering public safety communications interoperability.

The 2005 report identified five major goals for the Commonwealth:

- 1) Completion of the Mobile Data Project, a statewide wireless data communications initiative
- 2) Completion of the Mutual Aid Voice Communication Interoperability Plan (the Mutual Aid or MAVCIP Project)
- 3) Pursuit of a strategic initiative by KWIEC for the exchange of wireless data among public safety agencies (the KYWINS Messenger Project)
- 4) Participation in the SAFECOM First Responder Interoperability Pilot Project (the SAFECOM Project)
- 5) Installation of the first phase of upgrades to Kentucky Emergency Warning System (the KEWS Project)

Goals 1–4 above will be completed during 2006, while goal 5 is well underway. Additionally, significant progress was made with the Mutual Aid Voice Communications Plan, which was expanded to allow for new equipment. The KWIEC website has also been significantly expanded.

(1) Mobile Data Project — The KWIEC committee established standards and methodologies for a statewide public safety wireless data communication network. Wireless data communication is now fast becoming an integral tool for exchanging law enforcement information and for providing emergency services to the citizens of the Commonwealth. The Kentucky Office of Homeland Security provided funding to fill in the coverage gaps from the existing consortium data systems. The coverage was expanded in two phases. The first phase covered the northern part of the state. The second phase covered the western part of the state. Both phases were completed in 2006.

(2) Mutual Aid Project (MAVCIP) — In 2005, the Commonwealth of Kentucky launched the Mutual Aid and Interoperability Project to correct a long-recognized problem whereby first responders used voice systems that could not communicate with one another. This lack of voice interoperability severely limited responder effectiveness during emergencies and other situations requiring aid or assistance from neighboring agencies. The Mutual Aid and Interoperability Project, which will be completed in December of this year, resolved this problem by building a new network that provides several common channels in each of the three frequency bands used in the Commonwealth. These channels are nationally recognized and are dedicated to mutual aid, thereby allowing for local, state, regional, and federal cooperation as needed.

This project's cost was less than \$2 Million, but it has provided the means to allow all first responders across the state to communicate with each other in real time, with no loss of capability, and at absolutely no cost to participating agencies. At a cost of less than 50 cents per citizen, it is easy to see that this new capability more than pays for itself in potential savings of life, limb, and property. The project was so successful that it awarded the NASCIO best in the United States prize for "Business Continuity" earlier this year.

(3) KYWINS Messenger Project — First responders throughout the Commonwealth have ongoing requirements for text communications with each other in near real-time during non-emergency situations. While Kentucky has established a statewide standard for its wireless data infrastructure, various public

safety agencies have selected different mobile computing clients for their vehicle-based laptop computers. All of these mobile computing software products have IM components; however, they are proprietary and cannot communicate with each other. To resolve this issue and meet the requirements stated above, the Commonwealth has deployed an open source Jabber Instant Messaging system under a pilot project, which is expected to be complete in October 2006. The software is being field tested under real-world conditions by selected first responder agencies. A statewide deployment decision will be made by November 2006. Should the decision be made to deploy the software, the download will be made immediately available on the KWIEC website, and full implementation by agencies wishing to participate will occur by year's end.

(4) SAFECOM — On the fourth anniversary of the September 11, 2001 attacks, Governor Fletcher and representatives from the U.S. and Kentucky Departments of Homeland Security kicked off the SAFECOM Regional Communications and Interoperability Pilot Project. The goal of the SAFECOM Pilot Project is to ensure that Kentucky's first responders have the necessary means to communicate with one another during an emergency by developing a comprehensive statewide interoperable communications strategy.

The Statewide Strategic Plan, delivered to the Commonwealth on June 7, 2006, is the product of a strategic planning session and a series of regional focus group sessions held in Kentucky from September through December 2005. During these sessions, Kentucky's public safety practitioners shared experiences and visions for improving public safety communications and interoperability statewide. The plan relies on a locally driven strategy, in which the knowledge and needs of local responders are drawn on to build the appropriate initiatives for improved emergency response.

The Commonwealth has reviewed this plan and is in the process of developing a project to inventory the current communications environment.

(5) KEWS Project — COT is pleased to report that the Kentucky Emergency Warning System (KEWS) upgrade, funded at a level of \$26.8 Million by the legislature in the 2004-2006 budget cycles, has awarded the contract to Harris Microwave Corporation. Harris submitted a proposal to design and implement an internet protocol (IP) based digital microwave network across the Commonwealth. This system is superior to the existing system in every way; when fully implemented it will provide a self-healing, robust backbone that will continue to support public safety agencies in their missions to protect Kentucky's citizens. The system has been designed with future growth and initiatives in mind. Technologies such as video and voice over IP are directly supportable. This project is currently underway and teams are conducting surveys to gather the information necessary to produce the engineering packets and overall network design. Installation and testing of the first leg of the new network from Somerset to Frankfort is targeted for completion in 2007.

The interoperability goals of 2006 continue efforts to provide the infrastructure and resources to expand the capabilities of Kentucky's existing communications networks and systems. With ongoing support from the legislature, the Commonwealth will continue improving communications interoperability across a broad spectrum of public agencies in the state.

Purpose

As required by KRS 11.5163 – Annual Report by Chief Information Officer, “The executive director shall report by September 15 annually to the Interim Joint Committee on Seniors, Veterans, Military Affairs, and Public Protection and the Interim Joint Committee on State Government on progress and activity by agencies of the Commonwealth to comply with standards to achieve public safety communications interoperability.”

Introduction

The Commonwealth of Kentucky recognizes the importance of voice and data communications interoperability for public safety agencies at all levels of government. Several events in recent history compel us to work cooperatively to improve public safety communications. First responders need to be able to communicate with each other so that no lives are lost because public safety personnel cannot communicate with one another.

This report serves to update the committee members on the progress of the Kentucky Wireless Interoperability Executive Committee (KWIEC) since the last reporting cycle in the following areas. The KWIEC has:

- ✚ Continued to use the standardized template for the review and approval process of project submission plans in order to be in compliance with the directives of HB226
- ✚ Overseen the architecture board responsible for reviewing and assessing the interoperability project plans submitted to the Commonwealth for all first responder agencies
- ✚ Provided briefings and meetings in support of interoperability initiatives
- ✚ Maintained and updated the KWIEC website with major interoperability initiatives
- ✚ Continued working toward the development of recommended and required architecture and standards, which ensure that new or upgraded Commonwealth public safety communications systems will interoperate

This report also describes the progress and accomplishments in furthering public safety communications interoperability in the following key initiatives:

- ✚ Completion of the statewide wireless data communications project (Mobile Data Project)
- ✚ Completion of the Mutual Aid Voice Communication Interoperability Plan (Mutual Aid Project, or MAVCIP)
- ✚ Pursuit of a strategic initiative by KWIEC for the exchange of wireless data among public safety agencies (KYWINS Messenger Project)
- ✚ Participation in the SAFECOM First Responder Interoperability Pilot Project (SAFECOM Project)
- ✚ Installation of the first phase upgrades for Kentucky Emergency Warning System (KEWS Project)

Background

Kentucky Wireless Interoperability Executive Committee

The Kentucky General Assembly passed HB309 creating the Kentucky Wireless Interoperability Executive Committee (KWIEC) administered through the Commonwealth Office of Technology.

The committee benefits the Commonwealth by:

- ✦ Creating a nationally recognized name, the State Interoperability Executive Committee (SIEC), and structure as recommended by the Federal Communications Commission;
- ✦ Encouraging more involvement from interested agencies with the addition of local representatives from municipal and county government, police, fire, sheriff, EMS, and a 911 dispatch representative;
- ✦ Instituting an annual reporting mechanism whereby the chief information officer updates the Joint Interim Committee on Seniors, Veterans, Military Affairs, and Public Protection, and the Interim Committee on State Government.

Kentucky Wireless Interoperability Executive Committee Function

- ✦ Address communications interoperability, a homeland security issue critical to the ability of public safety first responders, to communicate with each other by radio.
- ✦ Advise and make recommendations to the chief information officer of the Commonwealth regarding strategic wireless initiatives to achieve public safety voice and data communications interoperability.

Kentucky Wireless Interoperability Executive Committee Meetings

The Kentucky Wireless Interoperability Executive Committee (KWIEC) consists of state and local representatives who are typically executives in their own agencies. The chart below lists the voting members on the committee and their representing agency.

Name	Representing	Position
Mark Rutledge	Commonwealth Office of Technology	Chair
Jim Barnhart	Commonwealth Office of Technology	Member
Ken Mitchell	Office of the 911 Coordinator	Member
Michael Clark	Kentucky Educational Television	Member
Jennifer Weeks	Transportation Cabinet	Member
Don Pendleton	Justice Cabinet	Member
Lt. Col. Shelby Lawson	Kentucky State Police	Member
Col. David Casey	Department of Fish and Wildlife Resources	Member
Bill Carr	Natural Resources and Environmental Protection	Member
Bob Stephens	Division of Emergency Management	Member
Mary Pedersen	Kentucky Homeland Security	Member
Lorna Jones	Cabinet for Health Services	Member
Mike Rosenstein	Council on Postsecondary Education	Member
Lonnie Lawson	The Center for Rural Development	Member
Constance Lawson	Municipal Government	Member
Judge Dean Peak	County Government	Member
Michael Ward	Municipal Police	Member
Terry Lewis	Local Fire Department	Member
Boston Hensley	County Sheriff	Member
Charles O' Neal	Local EMS	Member
James Morse	Local 911 Dispatch Center	Member

HB226

HB226 was passed by the 2004 General Assembly and signed into law by Governor Ernie Fletcher. The Bill amended KRS 11.5162 to expand the definitions of "frequency," "interoperability," and "standards," and create definitions for "public safety shared infrastructure" and "primary wireless public safety voice or data communications systems," and excludes "911" telephone systems from the definition of "primary wireless public safety voice or data communications systems."

The entire text of KRS 11.5162 is available online at www.lrc.state.ky.us/KRS/011-00/5162.PDF

With the passage of HB226, KRS 11.5163 was amended to include these requirements:

- ✚ The development and recommendation of required architecture and standards will ensure that new or upgraded Commonwealth public safety communications systems will interoperate.
- ✚ The Kentucky Wireless Interoperability Executive Committee shall be responsible for the evaluation and recommendation of all wireless communications architecture, standards, and strategies.
- ✚ All state agencies in the Commonwealth shall present all project plans for primary wireless public safety voice or data communications systems for review and recommendation by the committee, and the committee shall forward the plans to the chief information officer for final approval. Local government entities shall present project plans for primary wireless public safety voice or data communications systems for review and recommendation by the Kentucky Wireless Interoperability Executive Committee.
- ✚ The committee shall develop funding and support plans that provide for the maintenance of and technological upgrades to the public safety shared infrastructure, and shall make recommendations to the chief information officer, the Governor's Office for Policy and Management, and the General Assembly.
- ✚ The chief information officer shall examine the project plans for primary wireless public safety voice or data communications systems of state agencies and shall determine whether they meet the required architecture and standards for primary wireless public safety voice or data communications system.

The entire text of KRS 11.5163 is available online at www.lrc.state.ky.us/KRS/011-00/5163.PDF.

2006 Public Safety Wireless Interoperability Program

Interoperability Accomplishments

The 2005 Report to the committee identified five major goals for the Commonwealth in order to achieve communication interoperability among public safety agencies. At that time, these goals were perceived to be attainable, even with the understanding of the extensive work and collaboration requirements among the various public safety agencies.

The 2005 goals were as follows:

- 1) Completion of the statewide wireless data communications project (the Mobile Data Project)
- 2) Completion of the Mutual Aid Voice Communication Interoperability Plan (the Mutual Aid or MAVCIP Project)
- 3) Pursuit of a strategic initiative by KWIEC for the exchange of wireless data among public safety agencies (the KYWINS Messenger Project)
- 4) Participation in the SAFECOM First Responder Interoperability Pilot Project (SAFECOM Project)
- 5) Installation of the first phase upgrades for Kentucky Emergency Warning System (the KEWS Project)

Goals 1–4 will be completed during 2006, while goal 5 is well underway.

- ✚ Completion of the statewide wireless data communications project (Goal 1)
 - More than 145 sites have been deployed to provide substantial RF coverage to Mobile Data Terminals, which are in direct support of this network across the Commonwealth
 - Participants have full data interoperability and may roam across regions using the Mobile Data Terminals
- ✚ Completion of the Mutual Aid Voice Communication Interoperability Plan (Goal 2)
 - More than 100 new multi-channel VHF, UHF, and 800MHZ radio systems have been deployed across the Commonwealth with ten of 16 regions currently completed
 - The remaining 50+ radios across the six remaining regions will be installed by December 2006
 - Obsolete and malfunctioning Mutual Aid radio systems will be completely replaced
 - Total radio coverage will be approximately 97 percent of the Commonwealth at the conclusion of this project in December
 - Agency training will be conducted across the 16 KSP regions by December 2006
- ✚ Pursuit of a strategic initiative by KWIEC for the exchange of wireless data among public safety agencies (Goal 3)
 - The KYWINS Messenger project is nearing completion of the pilot phase
 - Nearly 100 participants representing a mix of first responder agencies from six counties were represented
 - A deployment decision will be made in November
- ✚ Participation in the SAFECOM First Responder Interoperability Pilot Project – SAFECOM Project (Goal 4)
 - SAFECOM reports were provided to the Kentucky Office of Homeland Security
- ✚ Installation of the first phase upgrades for Kentucky Emergency Warning System (KEWS) – KEWS Project (Goal 5)
 - Surveys of more than 140 sites will be completed by December 2006
 - Microwave network system design and engineering packets for the Eastern segment will be completed

Partnerships Established to Promote Communication Interoperability

The Kentucky Wireless Interoperability Executive Committee, through the Commonwealth Office of Technology, has continued to work with numerous state and local agencies with the goal of achieving interoperable solutions for both voice and data wireless communication systems. Review and recommendation of project plans for their primary wireless public safety voice or data communications systems has been provided to state and local agencies in pursuing opportunities and solutions for interoperable communications between disparate local radio systems.

The consortium of agencies consisting of the Louisville Metro Government, the Lexington Fayette County Urban Government, the Center for Rural Development, the Commonwealth Office of Technology, the Kentucky Justice and Public Safety Office, and the Ohio Valley Interoperability Communication Consortium (OVICC) have continued their partnership, which allows them to interlink their standards-compliant wireless data networks into a single logical network.

This partnership provides a seamless statewide wireless data network that empowers first responders with the capability to roam out of their primary coverage zones and connect with another consortium member's public safety wireless data network while responding to an emergency incident or disaster. Other non-consortium public safety agencies will be allowed to piggyback on this infrastructure, thus saving those agencies the cost of maintaining and administering their own wireless data networks.

There is an ongoing partnership with the Center for Rural Development in Somerset, a non-profit 501(c)3 organization that covers the forty-two county area of Kentucky's 5th Congressional district. This relationship includes the support, planning, and implementation of current and future cooperative wireless initiatives.

Other partnerships continue to be formed in programs such as the Voice Mutual Aid and Interoperability program, which has nearly 100 agencies participating and partnering to provide support to each other.

SAFECOM First Responder Interoperability Pilot Project

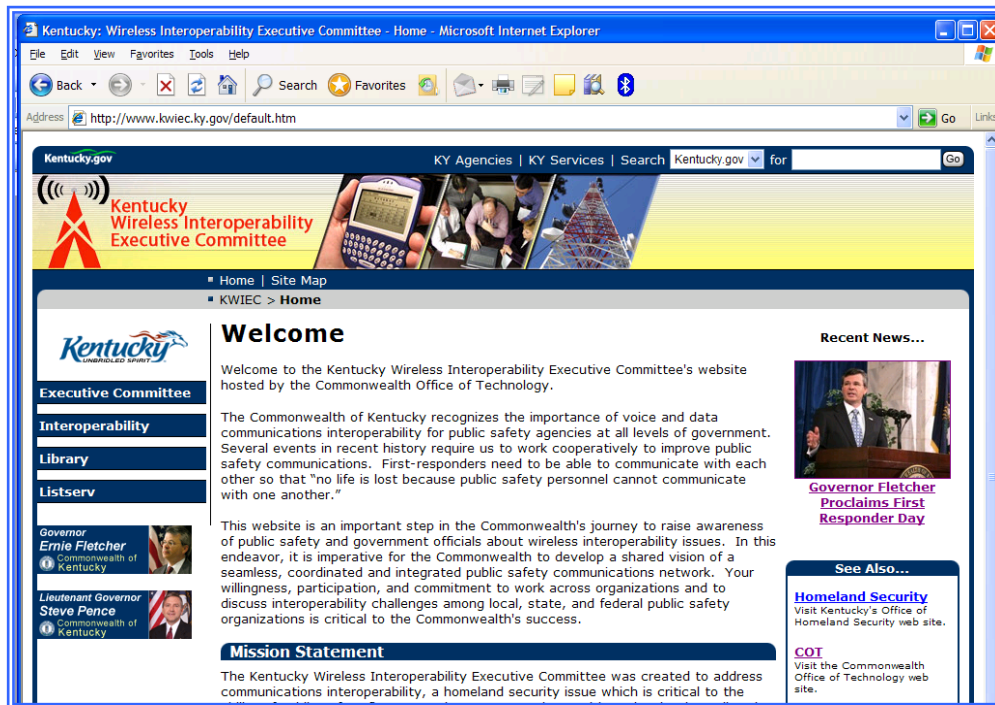
Kentucky was one of only two states selected by SAFECOM to take part in a First Responder Communication Pilot Project to provide a statewide strategy to implement radio interoperability communications throughout the Commonwealth. SAFECOM, which is managed by the federal Department of Homeland Security, provides guidelines and assistance for local, tribal, state, and federal public safety agencies working to improve public safety response through more effective and efficient interoperable wireless communications.

The Statewide Strategic Plan, which was delivered to the Commonwealth June 7, 2006, is the product of a strategic planning session and a series of regional focus group sessions held in Kentucky from September through December 2005. During these sessions, Kentucky's public safety practitioners shared experiences and visions for improving public safety communications and interoperability statewide. The plan relies on a locally-driven strategy, in which the knowledge and needs of local responders build the appropriate initiatives for improved emergency response.

The Commonwealth has reviewed this plan and is in the process of developing a project to inventory the current communications environment.

Kentucky Wireless Interoperability Executive Committee Website

The KWIEC website, which is available online at www.kwiec.ky.gov, provides information to the public and first responder communities about Kentucky's wireless interoperability initiatives.



The website continues to provide a means of disseminating information regarding public safety communication interoperability. It promotes the development of wireless standards and methodologies, lists approved standards and methodologies, and provides resources that include KWIEC meeting minutes, special event announcements, conference information, research documents, and web links.

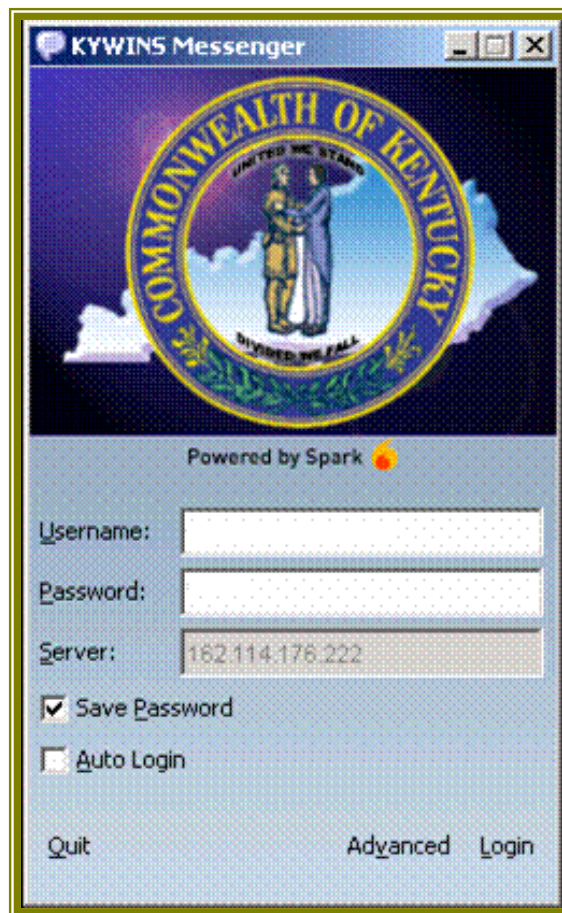
Kentucky Wireless Information Network System Messenger (KYWINS Messenger)

First responders throughout the Commonwealth have ongoing requirements for text communications with each other in near real-time during non-emergency situations. This communications requirement must use the existing Mobile Data Terminal (MDT) systems currently deployed, allow interoperability with any participating agency, be secure, occur in near real-time, have limited overhead, and interface with existing systems with negligible or no impact.

While Kentucky has established a statewide standard for its Wireless Data Infrastructure, various public safety agencies have selected different mobile computing clients for their vehicle-based laptop computers. All of these mobile computing software products have IM components; however, they are proprietary and cannot communicate with each other. To resolve this issue and meet the requirements stated above, the Commonwealth has determined that a non-proprietary instant messaging system would best serve the purpose of delivering interoperable wireless data communications.

After considering the problem and possible solutions, it was decided that the Commonwealth would deploy and test an open source Jabber Instant Messaging system under a pilot project. The software is being field tested under real-world conditions by selected first responder agencies that operate in and around Laurel County.

The pilot is expected to be complete in early October 2006. A statewide deployment decision will be made by November 2006. If the deployment is supported, the download will immediately be made available on the KWIEC website for implementation by agencies wishing to participate.



Kentucky Emergency Warning System (KEWS)

The Kentucky Emergency Warning System (KEWS) is a statewide analog microwave communications network that supports the communications requirements of local, state, and federal first responder agencies. The KEWS network's primary purpose is to support communications for these agencies in times of emergencies. Its secondary purpose is to provide connectivity and support to these and other agencies in their day-to-day operations.

The KEWS system was envisioned and built in the late 1970s to address a critical shortcoming in public safety communications. The system has grown and now consists of more than 140 analog microwave communications sites. The sites support thousands of first responders across Kentucky. Nearly 30 years later, the system is nearing or past the end of its expectant life and is clearly in need of replacement.¹

As technology continues to advance, customers have increasing needs for higher bandwidth, superior quality, enhanced features, and lower maintenance costs. Modern digital microwave systems tackle these requirements by providing an all digital network with self-healing and auto-routing capabilities.

With these requirements in mind, the Commonwealth studied several currently available solutions and then selected the Harris Microwave 5000 and 6000 series radios to replace the existing analog systems. The primary goal articulated to the vendor was to design and build a multi-service microwave network for the Commonwealth of Kentucky to support existing analog voice, data, and video services and provide the capacity for growth and integration of future communications.

The vendor's mission was to develop an Internet Protocol (IP) packet-based architecture on the microwave backbones and spurs that will be scalable and reliable in transporting current voice and data circuits as well as future applications. This new network will be 100 percent digital and all traffic will be encoded into standard Internet Protocol (IP) packet for transmission across the network. The backbone will route traffic across multiple legs at over 150Mbps using Multi-Protocol-Label-Switching (MPLS) technology. This technology allows for a bandwidth-on-demand protocol that provides for quality of service routing (QoS) and extremely high transfer and reliability rates. This is a proven technology that is in use or being migrated to by major local exchange carriers such as AT&T, Sprint, and others for routing traffic worldwide.

The traffic carrying capabilities provided by this new system will open the doors for advancement in other areas of public safety that include medical and educational institutions, local governments, economic development authorities, and non-profit organizations, to deliver their services to the citizens of the Commonwealth.

To simplify project implementation, the state has been divided into eastern and western segments, which will be taken in turn. Work within each segment will occur in two major phases: Phase 1 is the engineering phase, which consists of conducting surveys and gathering all the needed information to design the complete network, and Phase 2 will consist of the actual network build-out.²

The Commonwealth is currently in Phase 1 of this project, which is targeted for completion by the end of the year. Phase 2 will follow immediately after Phase 1 has been completed, and is expected to take two

¹ See page 13 for a map of the KEWS network

² See segment map, page 14

years to implement. The Eastern segment is expected to be completed in 2007, and the Western segment will follow on in 2008.

This project is considered to be of the highest importance to the Commonwealth. A delegation consisting of senior representatives, including the commissioner of the Commonwealth Office of Technology, briefed several Washington DC committees on the project. This trip was made to actively promote and secure additional funding for this project and was briefed to key congressional stakeholders and such major committees as the Department of Homeland Security's Office of Interoperability and Compatibility, the National Telecommunications and Information Administration (NTIA), and U. S. Department of Agriculture's Rural Utility Services (RUS).

Successful completion of this project will enable the Commonwealth to continue to provide a reliable emergency communications system capable of transmitting critical voice and data information for at least 30 more years. Since the network will be MPLS/IP based, future efforts including voice and video over IP will be easy to implement.

Kentucky Emergency Warning System

Network Topology

Legend:

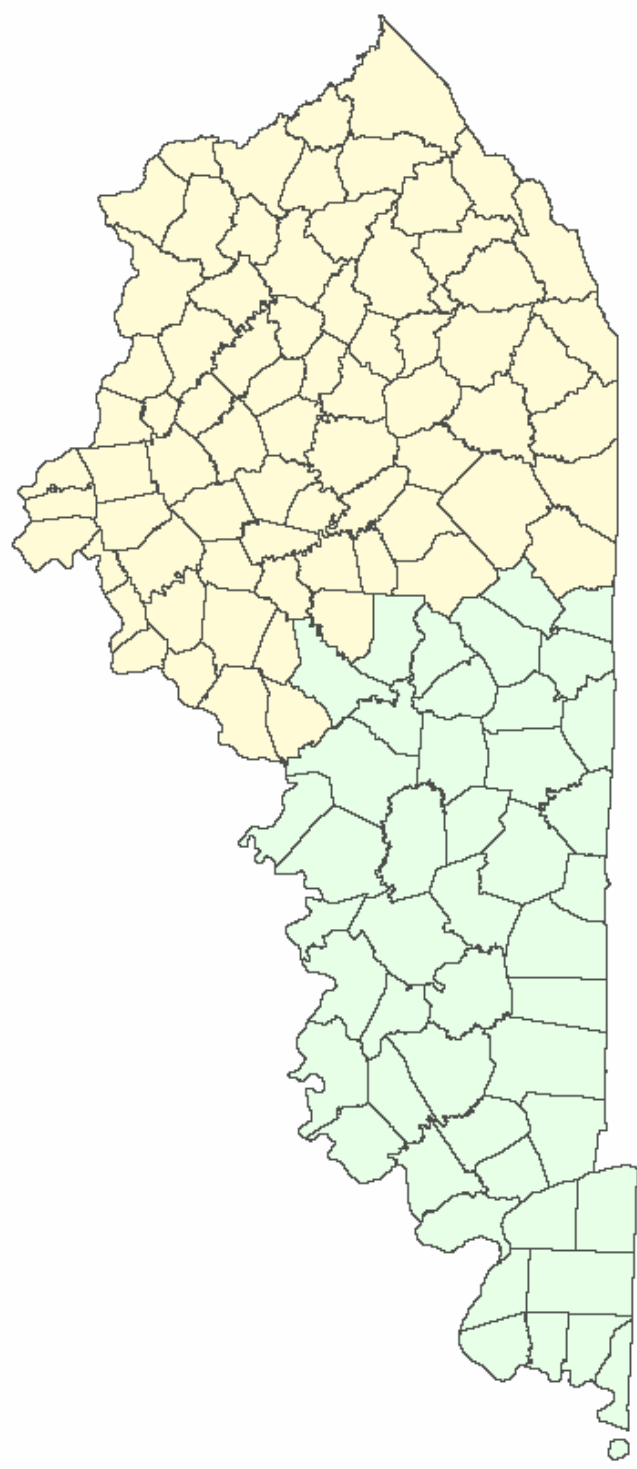
- Message Backbone or Video Xmt/Studio Site
- Light Traffic Spur Site
- Cable/Fiber Linked Non-KEWS Maintained Site
- Loop-Protected Message Backbone/KET Video Route
- OLP Message Backbone/KET Video Route
- Non-Protected Message Backbone/KET Video Route
- Multiplexed KET Video & Light Traffic Message Route
- KET Video Route
- Hot-Standby Light Traffic Message Route
- Non-Protected Light Traffic Message Route
- Fiber Optic Message/Video Link
- Copper Cable Link

- Message Backbone or Video Xmr/Studio Site
Light Traffic Spur Site
Cable/Fiber-Linked Non-KEWS Maintained Site
Loop-Protected Message Backbone/KET Video
OLP Message Backbone/KET Video Route
Non-Protected Message Backbone/KET Video
Multiplexed KET Video & Light Traffic Message
KET Video Route
Hot-Standby Light Traffic Message Route
Non-Protected Light Traffic Message Route
Fiber Optic Message/Video Link
Copper Cable Link



KEWS Digital Migration

- Eastern Segment Surveys
- Western Segment Surveys



LIMITATION OF LIABILITY: The contributors to this map product and the supporting data have no reason to believe that there are any inaccuracies or defects in information incorporated in this work and make no representations of any kind, including, but not limited to, the warranty of merchantability or fitness for a particular use, nor any such warranty to be implied, with respect to the information or data furnished herein.

Kentucky Finance
& Administration Cabinet



Prepared by:
Division of Geographic Information (DGI)



Wireless Data Communications Interoperability

The Commonwealth has recognized the emergence of data communications and information sharing as integral tools for providing emergency services to citizens. The state is driving deployment of wireless data communication networks. Lexington, Louisville, and other urban areas were the first to deploy wireless data technology, but rural areas serviced by the Center for Rural Development have also developed a region-wide wireless data communication network encompassing forty-two southeastern counties. With funding from the Kentucky Office of Homeland Security, coverage from the existing data systems was expanded in two phases. The first phase covered the northern part of the state. The second phase covered the western part of the state.

The Kentucky Wireless Interoperability Executive Committee (KWIEC) created the Architecture and Standards Working Group that established the vision, standards and methodologies for public safety wireless data interoperability and the standards and methodologies necessary to achieve its vision. This working group is represented by agencies in the areas of homeland security, information technology, and public safety.

- ✚ The vision for public safety wireless data communication interoperability in the Commonwealth of Kentucky is to establish seamless wireless data communications standards and methodologies that will enhance the Commonwealth's ability to deliver effective and timely emergency services to its citizens and avoid the creation of separate disparate non-interoperable public safety wireless data communication networks.
- ✚ The standard for public safety wireless data communications interoperability in the Commonwealth is the Public Safety Wireless Data Interoperability Standard operating at 19.2 Kbps @ 800 MHz using the IPMobileNet Wireless Data Specification.

Support of the shared vision and the passage of the wireless data interoperability standard by KWIEC established the foundation for public safety agencies to operate their wireless data equipment within their own networks. An additional interconnect methodology was needed to couple these wireless networks together to achieve a statewide seamless wireless data network across the Commonwealth. The Architecture and Standards Working Group developed the Internet Protocol Network Connectivity (IPNC) for Wireless Data Communications for the Commonwealth of Kentucky. This further supported the shared vision of a seamless wireless data network spanning the Commonwealth that will allow a first responder to roam out of the primary coverage zone and still be connected to the network.

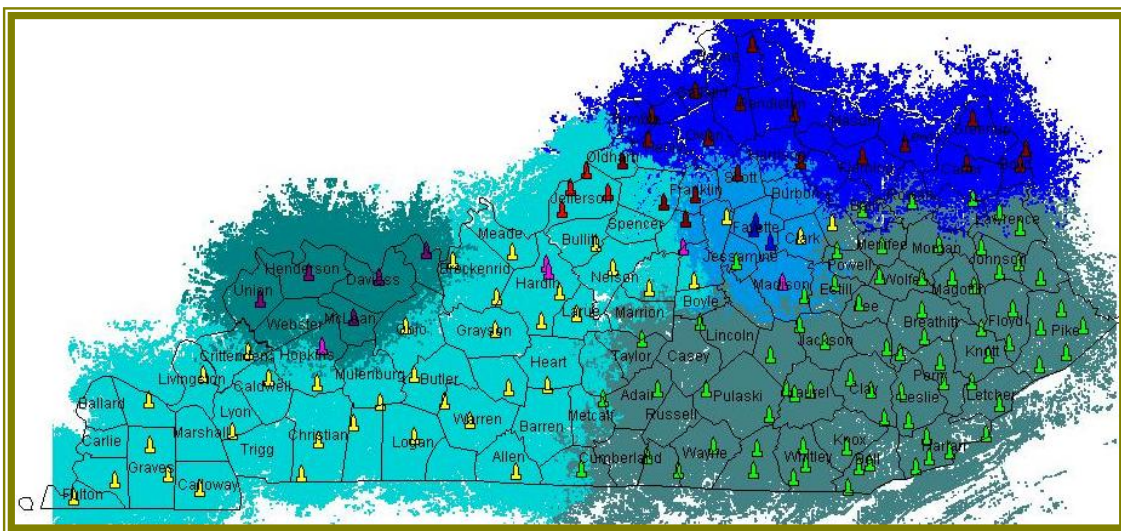
Wireless Data Communications Deployment

In order to achieve the maximum return on aggregate statewide investment in network construction and management, agencies have agreed to interlink their standards-compliant wireless data networks into a single logical network. This has created a seamless statewide wireless network that allows first responders to roam out of their primary coverage zone while responding to emergency incidents or disasters. Also, agencies that do not have the necessary frequencies and/or resources to sustain a wireless data network on their own use the wireless data infrastructure at no charge. This allows smaller, financially-challenged agencies access to a statewide wireless data network.

The agencies that make up the consortium are listed below. Some agencies are multi-county with a governance structure that enables them to share the infrastructure among their participating agencies.

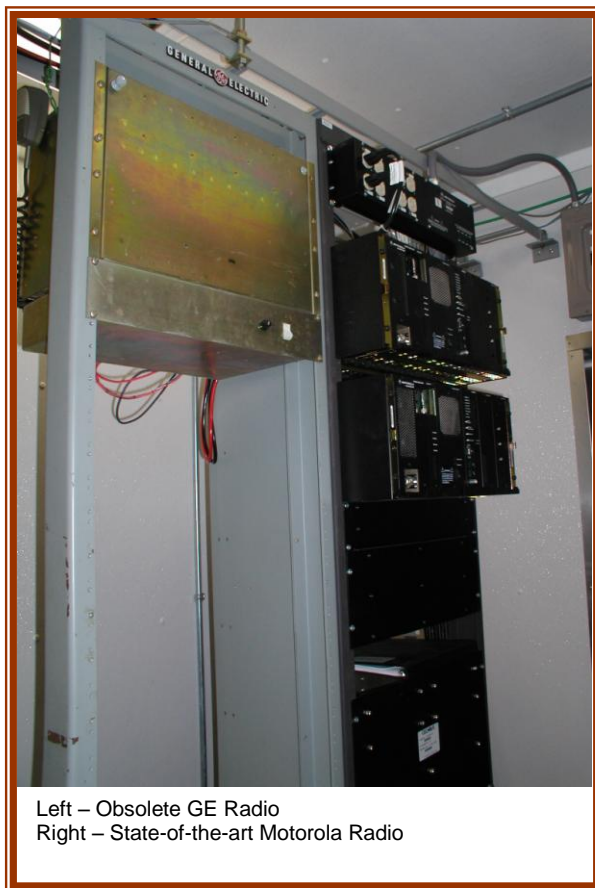
1. Ohio Valley Interoperability Communications Consortium
2. Lexington Fayette County Urban Government
3. Louisville Metro Government
4. Kentucky Justice and Public Safety Cabinet
5. Commonwealth Office of Technology
6. Center for Rural Development

The propagation map below displays the current deployment plan of the wireless data coverage throughout the Commonwealth. The wireless data network was expanded in the northern and western areas of the state in two phases, both of which are now completed. Funding for the wireless data infrastructure was provided through the Kentucky Office of Homeland Security Grants (2004, 2005.)



Wireless Voice Communications Deployment (Mutual Aid Plan)

Prior to the Mutual Aid and Interoperability Project, local, county, state, and federal public safety first responders were using private radio systems that precluded interagency communication. Use of different frequency ranges and communication protocols obstructed the seamless transfer of voice communications between first responders. This led to problems when these officials were called to respond to emergencies or situations requiring assistance from neighboring agencies.



Public safety agencies across the Commonwealth primarily operate in three frequency bands; 150, 450, and 800 MHz. Since most radios did not have the capability to operate on different frequency bands, public safety first responders could not communicate with one another unless they were operating within the same frequency band and were utilizing the same communication protocol.

The Mutual Aid and Interoperability Program provides the capability for agencies to tune in to dedicated pre-defined frequencies using the standard Conventional Analog communications protocol, which is shared among one or more public safety agencies. All radios used in the Commonwealth have the capability to communicate using this communication protocol.

When completed, this project will provide real-time communications to all participating first responder agencies and provide the ability to interconnect within and across the 150, 450, and 800MHz frequency bands currently in use. This added capability will give incident commanders the ability to coordinate efforts and resources across service boundaries reducing unneeded call-outs, limiting the overall confusion and delays associated with emergencies, and, ultimately, saving lives.

Incident commanders may now coordinate and control multiple agencies and resources from situations requiring only local coordination, up to and including major incidents or disasters that may cross multi-state and federal boundaries.

Unlike other programs that have a cost associated with each additional participating agency, this program has a fixed cost for the network and has no diminishing returns on investment. As more agencies participate in the program, more unneeded events will be prevented and greater cost savings will be realized. More importantly, this new capability requires no additional personnel and is free to all participating agencies.

Upon completion of this project, 152 new radio systems comprising 100 percent of the network will be installed, and the obsolete radio systems originally planned for the mutual aid network will be replaced with new state-of-the-art digital capable, multi-channel Motorola Quantar radio systems. These systems are vastly superior and provide additional capabilities not available in the systems they replace.

The chart below lists the current progress of radio replacements in each region and, as can be seen, the project is nearing completion with an expected end date of December 2006.

Region	VHF	UHF	800	Region	VHF	UHF	800
1	Complete	Complete	Complete	2	Complete		Complete
5	Complete	Complete	Complete	3	Complete		Complete
6	Complete	Complete	Complete	4	Complete		Complete
9	Complete	Complete	Complete	7	Complete		Complete
10	Complete	Complete	Complete	8	Complete		Complete
11	Complete	Complete	Complete	13	Complete		Complete
12	Complete	Complete	Complete				
14	Complete	Complete	Complete				
15	Complete	Complete	Complete				
16	Complete	Complete	Complete				

Once completed, first responders will have access to the Mutual Aid frequencies across nearly 100 percent of the Commonwealth. After the remaining UHF (450MHz) systems are replaced in the remaining regions, the six additional nationally recognized UTAC channels will be implemented in that band as well. The currently available Mutual Aid frequencies are listed in the graphic below.

MA Channels Now Available


ID	Direct	Use	PL = 156.7
VMA -	155.4750 MHz	Call Channel	
VCALL -	155.7525 MHz		
VTAC 1 -	151.1375 MHz		
VTAC 2 -	154.4525 MHz		
VTAC 3 -	158.7375 MHz		
VTAC 4 -	159.4725 MHz		

ID	Transmit	Receive/Direct	Use	PL = 162.2
UMA -	458.300 MHz	453.300 MHz	Call Channel	

ID	Transmit	Receive/Direct	Use	PL = 156.7
ICALL -	821.0125 MHz	866.0125MHz	Primary Call Channel	
ITAC 1 -	821.5125 MHz	866.5125MHz	Police	
ITAC 2 -	822.0125 MHz	867.0125MHz	Fire	
ITAC 3 -	822.5125 MHz	867.5125MHz	EMS	
ITAC 4 -	823.0125 MHz	868.0125MHz	Command and Control	

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Since this program is available across the state and to all first responder agencies, the structure can now be used for inter-agency coordination, incident command and control, and disaster response. True

interoperability can now be realized, since the primary barriers to effective communications have been removed.

One can easily infer that if this system had not been implemented, individual agencies would have continued addressing this problem in any number of incompatible ways. This approach would not only have failed, but it would have placed the cost burden entirely on the individual agencies, losing economies of scale.

Nearly 100 first responder agencies have signed the Memorandum of Understanding to utilize the Mutual Aid frequencies. This number is expected to increase as agencies are made aware of the new capabilities and availability.

The Mutual Aid and Interoperability Program clearly provides new interoperability capabilities that were not previously available. This vastly increases effectiveness and efficiency as agencies interact to protect and come to the aid of Kentucky's citizens.

2007 Public Safety Wireless Interoperability Plans

The 2007 interoperability plans for the Commonwealth will sustain the momentum and improvements made in previous years, and allow continuation and completion of the aggressive projects started earlier.

Successful collaboration among public safety agencies will continue throughout the Commonwealth, leading to new opportunities to improve communications interoperability among the participating groups.

These partnerships, with the support of KWIEC and the legislature, will aid the Commonwealth in achieving the following goals in 2007:

- ✦ Design of a statewide voice interoperability system for public safety
- ✦ Complete the deployment of the KYWINS Messenger across all first responder agencies
- ✦ Design a technical approach for building a statewide communications systems as recommended by the SAFECOM Project
- ✦ Install all of the new Digital Microwave systems in the Eastern Segment of the Kentucky Emergency Warning System (KEWS)
- ✦ Establish a public awareness and outreach program for Public Safety and Communications Interoperability

Conclusion

The interoperability initiatives completed in 2006 move the Commonwealth one giant step forward in meeting the goal of true statewide interoperability. In 2006, the state will have completed an effective voice and data interoperable solution for first responders, and future years will allow expansion of these networks. The KEWS upgrade will further interoperability goals by allowing voice and data traffic routing across a robust and self-healing all-digital network.

The KWIEC has been greatly responsible for the success of these initiatives. Its members have continued to ensure that all major statewide initiatives meet the interoperability mandates set forth when this committee was created. In addition, KWIEC is greatly responsible for the interoperability accomplishments that occurred in 2006. Thanks in part to the members' varied backgrounds and expertise within their agencies, this group has been able to address the different requirements of each agency and recommend and approve initiatives that provide the most benefit to all. The KWIEC meetings continue to provide a venue for disseminating information on statewide initiatives and serves as a forum to initiate the interactions necessary to coordinate and combine efforts.

Continued support from the legislature for funding new interoperability initiatives and continued funding of the KEWS microwave infrastructure will be indispensable to the Commonwealth's ultimate goals of providing true communications interoperability to first responders.

The interoperability goals of 2007 are equally as ambitious as previous year's goals, but with the continued support of the various public safety agencies and the legislature, the Commonwealth of Kentucky will continue to witness improvement in public safety communication interoperability.